UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/657,413	09/08/2000	Kazuya Oda	0378-0371P	2487

7590 09/15/2006

Birch Stewart Kolasch & Birch LLp
Post Office Box 747
Falls Church, VA 22040-0747

EXAMINER	
HANNETT, JAMES M	
ART UNIT	**PAPER NUMBER**
2622	

DATE MAILED: 09/15/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/657,413	ODA, KAZUYA	
	Examiner	Art Unit	
	James M. Hannett	2622	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *06 July 2006*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-8* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-8* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *08 September 2000* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Arguments

Applicant's arguments with respect to claims 1-8 have been considered but are moot in view of the new ground(s) of rejection.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

1: Claims 1-8 are rejected under 35 U.S.C. 103(a) as being unpatentable over US 2002/0118291 Ishigami et al in view of USPN 5,555,464 Hatlestad in further view of USPN 4,558,365 Ochi.

2: As for Claim 1, Ishigami et al teaches in Figure 9 and on Paragraph [0075] a solid-state image pickup apparatus comprising: an image pickup section (1); and a signal feeding section (the signal feeding section is viewed by the examiner as the circuitry that supplies the drive pulses to both the vertical shift register and the horizontal shift register); said image pickup section comprising: photosensitive cells for photoelectrically transducing incident light representative of a scene, the photosensitive cells being arranged bi-dimensionally (2), in such position that each of the photosensitive cells is shifted in position from adjoining ones of the photosensitive cells in a horizontal and vertical direction; The pixels form a 2x2 matrix, therefore, all of the pixels are shifted in horizontal and vertical directions from each other. If the pixels were not shifted in the horizontal and vertical direction from each other, all the pixels

would overlap and would not form a 2X2 matrix array. Ishigami et al teaches on Paragraph [0075] The shifting is performed using the vertical and horizontal CCD registers. Ishigami et al teaches on Paragraph [0115-0116] that the color filters are red, green, and blue color filter segments for separating colors of incident light, each of the color filter segments being positioned in front of a particular one of the photosensitive cells in a direction of the incident light. Ishigami et al teaches on Paragraph [0075] the use of transfer electrodes (3), each being assigned to a particular photosensitive cell, for reading out a signal charge generated by said photosensitive cell, said transfer electrodes being assigned to vertical transfer paths and a horizontal transfer path substantially perpendicular to the vertical transfer paths;
The read out gates are viewed by the examiner as the transfer electrodes for each pixel. Ishigami et al teaches on Paragraph [0005] control circuitry for sequentially performing preliminary pickup and actual pickup, which reads all of the signal charges out of the photosensitive cells, and executing digital signal processing with resulting signals; preliminary pickup mode is viewed by the examiner as the mode in which the horizontal register is driven using the driving pulses as depicted in Figure 11. Actual pickup mode is viewed as the mode in which the four-phase driven horizontal register is driven as a two-phase register by driving the phases in the manner as depicted in Figure 13. The digital signal processing is viewed by the examiner as the process for performing (AWB, AE, and AF). Ishigami et al teaches the use of capturing a preliminary image for performing (AWB, AE, and AF) before an actual image pickup is performed. Ishigami et al teaches on Paragraph [0115-0116] said signal feeding section feeding transfer timing signals for transferring signal charges generated by only part of said photosensitive cells arranged on odd-numbered lines or even-numbered lines to the vertical

transfer paths via said transfer electrodes associated with said part of said photosensitive cells, the vertical drive signals for transferring said signal charges along said vertical transfer paths toward the horizontal transfer path, Ishigami et al teaches that in the case of a color image sensor it is important not to mix the color signals output from the pixels. Therefore, driving pulses are supplied so that every other column of pixel data can be output in order to prevent mixing of the colors. Therefore, this process forms at least one vacant packet (loss of column data) between packets holding the signal charges (every other column) transferred from the vertical transfer path (3). Furthermore, as depicted in Figure 17, the examiner views the electrode between the photocell (11) and the vertical shift register (112) as the first electrode. Furthermore, the electrode associated with transferring the charge vertically in the vertical shift register (112) is viewed as the second transfer electrode. The third electrode is viewed by the examiner as the electrodes that pass the charge within the horizontal shift register (114).

Ishigami et al depicts in Figure 14 that the image sensor has Red, Green, and Blue Pixels. Ishigami et al teaches in Paragraph [0115] that the colors can be arranged in various patterns. However, Ishigami et al does not specifically state that the colors can be arranged each being arranged in a vertical stripe pattern.

Hatlestad teaches on Column 4, Lines 26-48 and depicts in Figure 1 that it is advantageous to design image sensors so that the colors are arranged in a vertical stripe pattern in order to only have one color for any given column.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to arrange the color filters of Ishigami et al arranged in a vertical stripe pattern as taught by Hatlestad in order to only have one color for any given column.

However, Ishigami et al in view of Hatlestad does not teach that the pixels can be shifted from each other by substantially halfway from adjoining pixels.

Ochi teachers on Column 3, Lines 66-68 and Column 4, Lines 1-5 and depicts in Figure 3 that it is advantageous when designing an image sensor to arrange the pixels in a zigzag pattern in which the pixels are shifted from each other by substantially halfway from adjoining pixels in order to maximize the light sensitivity of the pixels and reduce moiré fringing effects.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to arrange the pixels in the imaging system of Ishigami et al in view of Hatlestad in a zigzag pattern in which the pixels are shifted from each other by substantially halfway from adjoining pixels as taught by Ochi in order to maximize the light sensitivity of the pixels and reduce moiré fringing effects

3: In regards to Claim 2, Ishigami et al teaches on Paragraph [0083] wherein in the event of the preliminary pickup said signal feeding section outputs said horizontal drive signals such that a well is formed in each packet of said horizontal transfer path adjoining a packet storing the individual signal charge at the same time as a well formed in said packet storing said individual signal charge. The preliminary pickup mode is viewed as the mode when the four-phase driven horizontal register is driven as depicted in Figure 11. Because the Phases (H1b and H2a) are in common for a period of time and Phases (H1a and H2b) are in common for a period of time, a well is formed in each packet of said horizontal transfer path adjoining a packet storing the individual signal charge at the same time as a well formed in said packet storing said individual signal charge.

4: As for Claim 3, Ishigami et al teaches on Paragraph [0083] wherein said signal feeding section outputs said horizontal drive signals such that a range of said horizontal transfer path driven in a same phase and derived from an electrode structure of said horizontal transfer path is doubled.

5: In regards to Claim 4, Ishigami et al teaches on Paragraph [0083] and depicts in Figures 13 and 14 wherein when said horizontal transfer path has a four-electrode structure, said signal feeding section outputs said horizontal drive signal such that two phases are combined into a single phase.

6: As for Claim 5, Ishigami et al teaches in Figure 9 and on Paragraph [0075] a method of reading signal charges generated by photosensitive cells (2), which are arranged bi-dimensionally and each is shifted form adjoining photosensitive cells in a horizontal and a vertical direction for photoelectrically transuding light of particular separated color incident thereto. Ishigami et al teaches the pixels form a 2x2 matrix, therefore, all of the pixels are shifted in horizontal and vertical directions from each other. If the pixels were not shifted in the horizontal and vertical direction from each other, all the pixels would overlap and would not form a 2X2 matrix array. Ishigami et al teaches in a particular manner for preliminary pickup and actual pickup, which reads all of said signal charges out of said photosensitive cells for recording said signal charges said method comprising the steps of: Ishigami et al teaches on Paragraph [0115-0116] positioning in front of said photosensitive cells in a direction of light incidence a color filter, in which three primary colors R, G, and B, for separating incident light, and forming transfer electrodes each being assigned to a particular photosensitive cell for reading out a signal charge generated by said photosensitive cell, said transfer electrodes respectively contacting said

photosensitive cells; Ishigami et al teaches on Paragraph [0075] the use of transfer electrodes (3), each being assigned to a particular photosensitive cell, for reading out a signal charge generated by said photosensitive cell, said transfer electrodes being assigned to vertical transfer paths and a horizontal transfer path substantially perpendicular to the vertical transfer paths; The read out gates are viewed by the examiner as the transfer electrodes for each pixel. (b) Generating drive signals for reading out the signal charges generated by said photosensitive cells and representative of an image pickup; (the signal feeding section is viewed by the examiner as the circuitry that supplies the drive pulses to both the vertical shift register and the horizontal shift register) The read out gates are viewed by the examiner as the transfer electrodes for each pixel. Ishigami et al teaches on Paragraph [0005] control circuitry for sequentially performing preliminary pickup and actual pickup, which reads all of the signal charges out of the photosensitive cells, and executing digital signal processing with resulting signals; preliminary pickup mode is viewed by the examiner as the mode in which the horizontal register is driven using the driving pulses as depicted in Figure 11. Actual pickup mode is viewed as the mode in which the four-phase driven horizontal register is driven as a two-phase register by driving the phases in the manner as depicted in Figure 13. he digital signal processing is viewed by the examiner as the process for performing (AWB, AE, and AF). Ishigami et al teaches the use of capturing a preliminary image for performing (AWB, AE, and AF) before an actual image pickup is performed. Ishigami et al teaches on Paragraph [0115-0116] said signal feeding section feeding transfer timing signals for transferring signal charges generated by only part of said photosensitive cells arranged on odd-numbered lines or even-numbered lines to the vertical transfer paths via said transfer electrodes associated with said part of said photosensitive cells,

the vertical drive signals for transferring said signal charges along said vertical transfer paths toward the horizontal transfer path, Ishigami et al teaches that in the case of a color image sensor it is important not to mix the color signals output from the pixels. Therefore, driving pulses are supplied so that every other column of pixel data can be output in order to prevent mixing of the colors, This is viewed as vertical thinning.

Ishigami et al depicts in Figure 14 that the image sensor has Red, Green, and Blue Pixels. Ishigami et al teaches in Paragraph [0115] that the colors can be arranged in various patterns. However, Ishigami et al does not specifically state that the colors can be arranged each being arranged in a vertical stripe pattern.

Hatlestad teaches on Column 4, Lines 26-48 and depicts in Figure 1 that it is advantageous to design image sensors so that the colors are arranged in a vertical stripe pattern in order to only have one color for any given column.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to arrange the color filters of Ishigami et al arranged in a vertical stripe pattern as taught by Hatlestad in order to only have one color for any given column. However, Ishigami et al in view of Hatlestad does not teach that the pixels can be shifted from each other by substantially halfway from adjoining pixels.

Ochi teachers on Column 3, Lines 66-68 and Column 4, Lines 1-5 and depicts in Figure 3 that it is advantageous when designing an image sensor to arrange the pixels in a zigzag pattern in which the pixels are shifted from each other by substantially halfway from adjoining pixels in order to maximize the light sensitivity of the pixels and reduce moiré fringing effects.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to arrange the pixels in the imaging system of Ishigami et al in view of Hatlestad in a zigzag pattern in which the pixels are shifted from each other by substantially halfway from adjoining pixels as taught by Ochi in order to maximize the light sensitivity of the pixels and reduce moiré fringing effects

7: In regards to Claim 6, Ishigami et al teaches on Paragraph [0083] wherein in the event of the preliminary pickup said signal feeding section outputs said horizontal drive signals such that a well is formed in each packet of said horizontal transfer path adjoining a packet storing the individual signal charge at the same time as a well formed in said packet storing said individual signal charge. The preliminary pickup mode is viewed as the mode when the four-phase driven horizontal register is driven as depicted in Figure 11. Because the Phases (H1b and H2a) are in common for a period of time and Phases (H1a and H2b) are in common for a period of time, a well is formed in each packet of said horizontal transfer path adjoining a packet storing the individual signal charge at the same time as a well formed in said packet storing said individual signal charge.

8: As for Claim 7, Ishigami et al teaches on Paragraph [0083] wherein said signal feeding section outputs said horizontal drive signals such that a range of said horizontal transfer path driven in a same phase and derived from an electrode structure of said horizontal transfer path is doubled.

9: In regards to Claim 8, Ishigami et al teaches on Paragraph [0083] and depicts in Figures 13 and 14 wherein when said horizontal transfer path has a four-electrode structure, said signal

feeding section outputs said horizontal drive signal such that two phases are combined into a single phase.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. USPN 5,306,906 Aoki et al teaches the use of an image sensor with pixels shifted from each other by substantially halfway from adjoining pixels.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to James M. Hannett whose telephone number is 571-272-7309. The examiner can normally be reached on 8:00 am to 5:00 pm M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Vivek Srivastava can be reached on 571-272-7304. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

James M. Hannett
Examiner
Art Unit 2622

JMH
September 12, 2006